Worswick – Bai Method

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Introduction: In summary, this paper is to introduce a new way into solving the quadratic equation. As most people would know, the general way of solving a quadratic equation is using factorisation, completing the square, and the quadratic formula. The quadratic formula is derived from completing the square. Its result is $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$. The quadratic formula has been used for over 3000 years. However, quadratic formulas can be solved in a different matter.

The new method introduced here of solving the quadratic formula is most related to factorisation. Factorisation can be hard to use efficiently, especially when in use by new students. Due to this, students have consequently turned to the quadratic equation, even if this means that it will take a larger amount of time compared to factorisation. In the hands of a seasoned student, factorisation should not be a problem. In fact, factorisation should not be a problem for most students.

Main: The method in solving in this quadratic equation is somewhat simple compared to other methods with some practise. The method is based on splitting of the middle term. d and e become the middle terms.

You start with a typical quadratic equation: $ax^2+bx+c=0$.

Then you develop two simulations equations.

$$d+e=\sqrt{b^2-4ac}$$

$d-e=b$You can then solve $d$and e.

$d=\frac{b+\sqrt{b^2-4ac}}{2}e=\frac{b+\sqrt{b^2-4ac}}{2}-bax^2+bx+c=0$Then, we substitute these two numbers into this equation.

$ax^2+dx+ex+c=0e's\,positive\vee negative\,symbol\,will\,become\,opposite$

$The\,equation\,is\,then\,split\in the\,middle.ax^2+dx\vee ex+c=0$Factorise this equation.

$fx(gx+h)\vee i(gx+h)=0$Thus, the equation will become:

$(fx+i)(gx+h)=0$Thus the solution will become

$x=\frac{i}{f}$ or $x=\frac{h}{g}$

When using this method, it is important to note that there will be two $(gx+h)$ when factorising. This drastically makes this method easier, especially if the answers come to a decimal or irrational number.

Examples:

$x^2+5x+6=0$We use the method

$d+e=\sqrt{b^2-4ac}$

$d-e=b$In this case:
$d+e=1$

$d-e=5 Solving\ the\ simulatenous\ equation 2d=6$

$d=3 \therefore e=-2 x^2+5x+6=0$
$As\ mentioned\ above, e's\ negative \vee positive\ sign\ will\ be\ opposite\ of\ the\ sign\ found.$

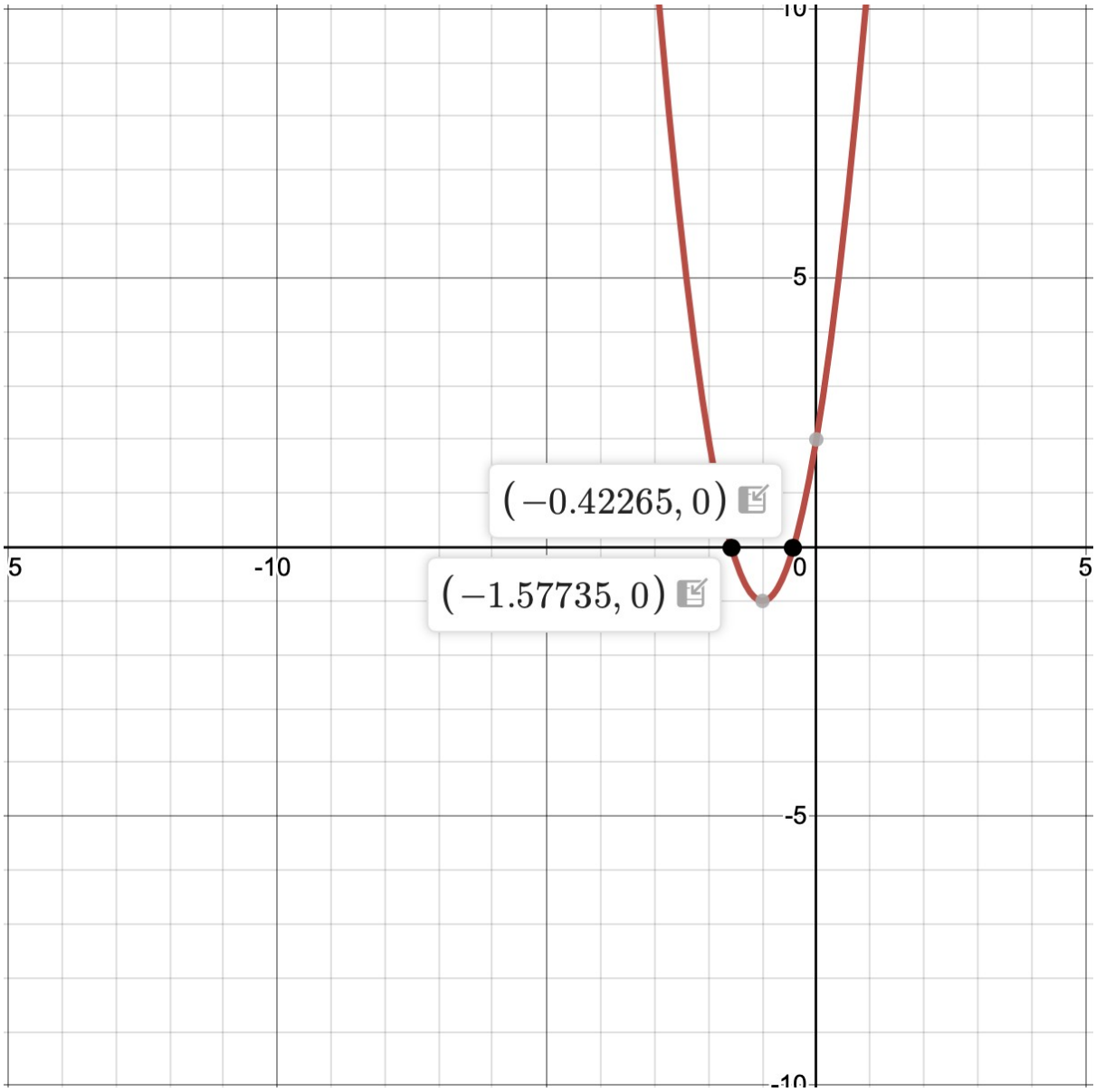
$x^2+3x+2x+6=0$

Then, splitting the equation can be completed.
$x^2+3x \vee 2x+6=0 x(x+3) \vee 2(x+3)=0 (x+2)(x+3)=0 x=-2 \vee x=-3$
$This\ not\ only\ fosters\ an$ individual in becoming more skilled in factorisation, but also allows a way to solve the quadratic equation.

This example is more challenging as it involves a decimal point answer.

$3x^2+6x+2=0$As any skilled individual in quadratics would see, this requires the quadratic equation to complete. However, the purpose of this method is to not use the quadratic formula.

$d+e=\sqrt{b^2-4ac} d-e=b d+e=3.4641 d-e=6 2d=9.4641 d=4.73205$
$e=-1.26795 3x^2+6x+2=0 3x^2+4.73205x+1.26795x+2=0$
$3x^2+4.73205x \vee 1.26796x+2=0 3x(x+1.57735) \vee 1.26796(x+1.57735)=0$
$(3x+1.26796)(x+1.57735)=0 3x=-1.26796 \vee x=-1.57735 x=-0.42265$In conclusion $x=-0.42265$ or $x=-1.57735$



Effectively, this method can solve any type of quadratic equation, including equations that have an irrational number as a result.

Summary:

The Worswick – Bai method works perfectly well on different quadratics. It allows for the easier factorisation of complex quadratics which may not have a clear factorisation solution. Additionally, it can factorise equations which cannot be

factorised by the original factorisation method and gives exact answers.